

ENERGY SECURITY: GETTING ABOVE THE FUNDING CUT LINE

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Disclaimer

The views expressed in this academic research paper are those of the author and do not necessarily reflect the official policy or position of the U.S. Government, the Department of Veterans Affairs, the Department of Defense, or any of its agencies.

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ENERGY SECURITY: GETTING ABOVE THE FUNDING CUT LINE

Introduction

In 2006 and 2007, the Department of Defense (DoD) spent \$26 billion per year on energy. In 2008, DoD requested an additional \$5 billion to offset higher prices. Each \$10 per barrel price increase in oil costs DOD over \$1.3 billion per year.¹ The Army Environmental Policy Institute (AEPI) developed a methodology for calculating casualty factors for fuel and water resupply convoys based on 2007 data from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). The study found that U.S. forces sustained 0.042 casualties for every fuel-related resupply convoy or one casualty for every 24 fuel resupply convoys in Afghanistan.² The Army cannot meet this enormous demand without fundamentally changing the culture and methods for managing and acquiring energy in both the Operational and Institutional (or Generating) Forces.

The Department of Defense (DOD) and the Army have addressed energy security issues for the past 5-10 years with varying levels of success in getting initiatives above the funding cut line. Any initiative requiring resources must first articulate its value versus cost. The terms “cost” and “resources” are inclusive of money, time, manpower, and equipment. Organizations have finite resources and cannot support every priority leading to a required cut line. The DoD and Army are no different and typically leadership conveys its support of initiatives by providing the necessary resources. Energy security within the DoD has historically remained below the funding cut line. Many reports, studies, articles and statutes referenced in this research paper underscore the growing emphasis of energy security as a national security issue

warranting the attention and action by the DoD and the Army, Navy, Air Force, and Marines (hereafter “Services”). Most of these reports provide similar recommendations and approaches creating a consistent message during the past two years. The February 2010, Quadrennial Defense Review and the Secretary of Defense (SECDEF) and Service Secretary written testimony before the House Armed Service Committee (HASC) were good indicators of renewed interest by DoD leadership. Another important indicator of leadership interest is the continuing reference to energy security aspects in each military initiative. The DoD should not feel obligated to address energy security as a separate and distinct initiative. A truly successful energy security strategy would be evidenced through its integration in every aspect of defending our nation. Acquisition, innovation, requirements and weapons’ systems development should address energy security as an integral component of every military initiative instead of a requirement by law or policy. The Army’s Energy Security Implementation Strategy (AESIS) is a good start, however this paper will provide additional suggestions to the ongoing development of a modeling tool, modifications to acquisition, measures of consumption, innovation, and culture change which are the keys to reducing the demand and expanding the supply. The term “weapon systems” in this paper is inclusive of all DoD systems that consume energy including weapons, transport, and support platforms. Operational forces refer to military forces directly fighting a war such as those currently in Iraq and Afghanistan. Institutional or Generating forces (in the Army’s vernacular) refers to military forces running military functions in support of installations and headquarters.

Getting Above the Funding Cut Line

For the purpose of this paper, the phrase “above the funding cut line” refers to leadership valuing energy security to place it above every cut line including funding, attention, and implementation. This is best demonstrated by the recently completed Winter Olympics in Vancouver. There’s a big difference between 3rd and 4th place in any Olympic event. It could mean Olympic Bronze medalist with many commercial endorsements or Olympic participant fading into obscurity. If you’re just below the line in 4th place, then what separated you from those just above the line? 1/100th of a second in downhill skiing or one inch in short track speed skating. Sporting events are determined by a specific measure such as time, points, or distance. However, subjective measures cloud the decisions when it comes to funding or levels of commitment for an initiative. So are you above or below the cut line?

A focus on innovation, culture, reducing demand, increasing supply, and energy efficiency in acquisition decisions are all very important aspects in the energy strategy. However, the key to raising these initiatives “above the funding cut line” also requires integrating energy components in every initiative developed and resourced by the Army. Leaders at all levels must understand and value energy security’s importance to their mission accomplishment. Instead of the Energy Executive or some other Army Energy office pushing for support, the Headquarters, Department of the Army Staff, must include energy specific requirements in its initiatives. If DoD and the Services only create stovepipe initiatives and funding streams, then the ability to sustain these efforts will be dependent upon personalities and waves of support that only experience short term success. Energy security initiatives should not focus on whether they can get the

attention of Army leaders but rather how they will benefit the acquisition of a new ground combat vehicle or significantly minimize the risk of an installation to an unstable local electrical grid. This will gain leadership attention and prioritization above the funding cut line.

Background

Energy Security is a National Strategic Issue

Thomas Friedman's latest book, Hot, Flat, and Crowded, describes how the Western world has created an insatiable appetite for energy and its increasing demand on finite resources. Friedman states that the larger challenge is, "the emergence of 200 million people in China and India from poverty in the last thirty years, most of them moving from low-impact village life to middle-class life in urban areas. There are still another 200 million behind them, and another 200 million behind them...all waiting their turn."³ Friedman's "Flat" refers to the ability of the world's population to compare its lifestyle and situation with everyone else. Communication advances such as the internet have fueled the desire for the world population to seek its share of the western lifestyle. Our future challenge is meeting this world demand with limited natural resources. Sharon Burke, Vice President for Natural Security, Center for a New American Security (CNAS), reinforces Friedman's view when she cited the National Intelligence Council (NIC) contention that, "emerging states are part of an extraordinary rebalancing of global wealth and power, which will characterize the 21st century."⁴ This rebalancing will result in more people experiencing improved living standards resulting, according to the NIC, that by 2025, "unprecedented economic growth, coupled by 1.5 billion more people, will put pressure on resources."⁵

Burke further connects energy security to climate change calling it Natural Security challenges. Natural security is defined as the “sufficient, reliable, affordable, and sustainable supplies of natural resources for the modern global economy.”⁶ She expands energy security’s connection to the national security consequences resulting from that consumption (climate change and biodiversity). This connection to other natural resources resonates with the military due to the scarcity of water in many parts of the world. Commandant of the U.S. Marine Corps (CMC), General James T. Conway, emphasizes that Marines are at-risk protecting the supply lines required to provide a continuing demand for fuel and water in Afghanistan where, unlike Iraq, never had an infrastructure.⁷ Convoys supply troops with bottled water creating a demand on supply lines similar to fuel.

The 2010 Quadrennial Defense Review (QDR) was the first official DoD document to recognize both energy security, climate change, and their corresponding linkage. Much of the debate on global warming focuses on the causal effects of warming. The QDR avoids that debate and jumps into the reality that current climate changes are already reshaping the military operating environment requiring adjustments to an expanding military role. The Navy recognizes that polar ice melt is creating a more navigable Arctic, expanding requirements for naval operations. The QDR addresses climate change not as a cause of conflict but rather “an accelerant of instability,” creating a burden to our response to nations around the world.⁸ A more direct affect of climate change is the impact to our installations and military capabilities due to rising sea levels. The current utilization of fossil fuels, which create the largest source of carbon, further links climate change to national security. As DoD implements

energy strategies, it must account for environmental impacts of alternative or renewable energy sources. We don't want to trade one finite resource for another in our quest to generate more energy sources while reducing our consumption.

A Defense Science Board study in 2001 reported that DoD is the single largest consumer of petroleum in the United States and that most of the world's oil is in Southwest Asia. This increases the probability for U.S. military intervention when the oil supply is threatened.⁹ The 2001 report was written and published prior to the events of 9-11 and the subsequent U.S. conflicts in Southwest Asia. A growing demand of finite resources leads countries to position themselves for control of those resources. Western lifestyles consume the most resources which is not bad if we manage it responsibly. Hopefully, the same western ideas that created the demand will also develop the solutions to manage the demand. We could potentially avoid future conflicts if we improve the management of the natural resources as the western lifestyle spreads to a larger portion of the world's population. For this reason, executing the evolving DoD and Service energy strategies is critical to minimizing the dependence on the resources that are frequently at the heart of international tension and armed conflict. The Services must ensure that their energy security initiatives get above the funding cut line.

Department of Defense Role in Energy Security

Management of energy demand and control of oil reserves threaten our national security. "The U.S. consumes 25 percent of the world's oil production, yet controls less than 3 percent of an increasingly tight supply."¹⁰ The consequences of our country's dependence on oil and the current political tensions within the Middle East and

Venezuela create a national security risk. The DoD is poised to take the lead to minimize that risk and the recently published Quadrennial Defense Review takes a hard stand on energy security in two ways. First, the DoD is best poised to leverage, on a large scale, energy efficiency as a major element of its development of new technology, innovations, culture changes, reduction in demand, supply diversification, and weapon systems acquisition. Second, the DoD is the largest single consumer of energy in the United States. “In 2006, it bought 110 million barrels of petroleum fuel and 3.8 billion kWh of electricity. This represents about 0.8 percent of total U.S. energy consumption and 78 percent of energy consumed by the Federal government.”¹¹ DoD is positioned as a key player in the nation’s campaign to reduce energy consumption and is best poised to change its culture in improving efficiencies.

Laws, Reports, and Strategies

This section will summarize the background of events and reports leading to similar but different Service energy strategies. We will then look at the potential solutions to the problem and the Army’s implementation. These solutions aim to keep energy security initiatives above the funding cut line.

The QDR restates many of the recommendations made by the Defense Science Board Energy Security Task Force incorporating energy considerations such as implementing the energy efficiency Key Performance Parameter (KPP) and the fully burdened cost of fuel (FBCF) in acquisition and system development decisions. The remaining QDR focused on innovation and technology but talked about the “creation of an innovation fund administered by the new Director of Operational Energy Plans and Programs to enable components to compete for funding on projects that advance

integrated energy solutions.”¹² It is unclear whether this is a new fund being established to partner with industry much like Defense Advanced Research Projects Agency (DARPA), or if it is a budget to direct and support specific initiatives within the Services. DARPA funds new technology development to ensure the Department of Defense maintains technological superiority.¹³ From an institutional standpoint, the QDR reveals departmental efforts to improve resiliency of military facilities by “conducting a coordinated energy assessment, prioritize critical assets, and promote energy efficiency investments to ensure installations are adequately prepared for prolonged outages.”¹⁴

Public Laws and Executive Orders

“Where the attention goes the energy flows” is a saying coined by Mr. Loren Lasher that helps to explain that we as individuals or members of a larger organization tend to spend our resources (time, dollars, effort, etc.) on areas that we attend to or interest us. This is exactly the case with energy security and how the Army must prioritize it above the “funding cut line”. There are numerous articles and reports by think tanks, contractors, and other agencies that have pushed energy security to the attention and interest of Department of Defense leaders. This, combined with legislation within the past three years, have raised the attention of DoD leaders and the proverbial energy is flowing towards this issue.

Public laws and Executive Orders set the guidance and standards for energy security in federal agencies including the Department of Defense. The most significant of these over the past five years include two Executive Orders (E.O. 13423 and E.O. 13514) and four Public Laws (the Energy Policy Act of 2005 P.L. 109-58, the Energy Independence and Security Act of 2007 P.L. 110-140, the National Defense

Authorization Act (NDAA) 2009 P.L. 110-417, and NDAA 2010 P.L. 111-84). Each law and Executive Order laid a framework for increasing a sustainable supply of energy while reducing demand. In each case, an Energy Act led to specific Department of Defense (DoD) targets required by each NDAA. The DoD was expected to act as a trailblazer considering it is the largest consumer of energy within the federal government.

The Energy Policy Act of 2005 set standards for reducing energy consumption previously dictated by the National Energy Conservation Policy Act, P.L. 95-619. These standards applied to all federal buildings and set into motion targets to reduce facility energy intensity by 2 percent each year based on a 2003 baseline. The Act also required metering all federal buildings by 1 October 2012.¹⁵ Executive Order 13423 “Strengthening Federal Environmental, Energy, and Transportation Management” dated 26 January 2007 increased the reduction to 3 percent per year. The Energy Independence and Security Act of 2007 (EISA 2007) also added requirements to meter steam and natural gas by 2016.¹⁶ Both energy reduction targets and metering requirements require the attention of military leaders. Later sections of this report will dig deeper into efforts to meet the targets and provide a measure through metering.

The two most recent NDAA's focused on both installations (federal buildings) and operational energy management. NDAA 2009 directed the Secretary of Defense (SECDEF) to develop and implement a methodology for enabling a fuel efficiency key performance parameter (KPP) during the development of military requirements. NDAA 2009 requires the SECDEF to include the fully burdened cost of fuel (FBCF) as part of the life cycle cost analysis when evaluating alternatives for new capabilities. Both the

energy efficiency KPP and the FBCF is an attempt to balance military capability with fuel efficiency in both acquisition and scenario-based force planning.¹⁷

NDAA 2009 and 2010 were the first to specifically address energy security as a separate Subtitle within the NDAA. It appears that Subtitle D – Energy Security within Title III – Operations and Maintenance will remain a standard subtitle for subsequent NDAAs. Laws alone can't drive change and improve efficiency, but they hold departments accountable and keep leaders' attention on the issue.

DoD Energy Security Task Force

In 1999, the Undersecretary of Defense for Acquisition, Technology & Logistics (USD(AT&L)) directed the Defense Science Board to form a Task Force to “identify technologies that improve fuel efficiencies for the full range of weapons platforms and assess their operational, logistical, cost, and environmental impacts.”¹⁸ The USD(AT&L) asked specifically for the study to identify fuel-efficient technologies with the “greatest potential to begin implementation within the next 10 years”. Interestingly, the May 2001 report recognized the value of fuel efficient weapon systems. However, DoD ignored its value in developing requirements or in the acquisition process. Instead, these processes focused appropriately on performance and mission accomplishment.. Without the inclusion of fuel efficiency or the true cost of fuel, the military could not sustain these weapons systems on the battlefield.

In May 2006, the USD(AT&L) directed the Defense Science Board to form another Task Force to examine DoD Energy Strategy as a follow-up to the 2001 report. The Energy Policy Act of 2005 had already set targets for reducing energy consumption in the previous year. The resultant report from the DoD Energy Security Task Force

(ESTF) in February 2008 identified the same recommendations previously made by the Defense Science Board in May 2001. It identified a lack of action in implementing the recommendations from the 2001 report. The difference in 2008 was that the nation had been at war for five years, and line commanders had spoken out on the burden of fuel dependency. The direct connection to the war fight and getting the issue “above the funding cut line” finally got DoD leadership’s attention. In addition to the lack of implementing the 2001 report, the ESTF noted a dependency of military installations on a national power grid that frequently endured extended outages placing the military mission at risk. It also noted a lack of a governance structure, policies, metrics, and an overriding strategy to manage these risks. The following five recommendations provided the basis of DoD and Service efforts to reduce the risk to Soldiers, Sailors, Airmen, and Marines as they accomplished their missions.

1. Accelerate efforts to implement energy efficiency Key Performance Parameters (KPPs) and use of the Fully Burdened Cost of Fuel to inform all acquisition trades and analyses about their energy consequences, as recommended by the 2001 DSB Task Force.
2. Reduce the risk to critical missions at fixed installations from loss of commercial power and other critical national infrastructure.
3. Establish a Department-wide strategic plan that establishes measurable goals, achieves the business process changes recommended by the 2001 DSB report and establishes clear responsibility and accountability.
4. Invest in energy efficient and alternative energy technologies to a level commensurate with their operational and financial value.

5. Identify and exploit near-term opportunities to reduce energy use through policies and incentives that change operational procedures.¹⁹

DoD provided an October 2008 report to Congress on the progress of these recommendations, and it appears that the energy security issue was once again slowly falling below the “funding cut line”. The Army published the Army Energy Security Implementation Strategy (AESIS) in January 2009 and continues to massage its measures and initiatives. In the summer of 2009, the Navy showed renewed emphasis by establishing an Energy Security Task Force along with a Climate Change Task Force. In October of that same year, the Navy Energy Forum provided the opportunity for industry to better understand the Navy’s strategy to meet the ambitious goals set forth by the leadership. Secretary of the Navy Ray Mabus used the opportunity to set ambitious targets for the Navy and Marines. He proposed to create a "Green Strike Group" by 2012 composed of nuclear vessels and ships powered by biofuels and deploying that fleet by 2016; reducing petroleum use in its 50,000 commercial vehicle fleet by 50 percent by phasing in hybrid fuel and electric vehicles by 2015; producing at least half the shore-based energy requirements from renewable sources, such as solar, wind and ocean generated by the base; and ensuring at least 40 percent of the Navy’s total energy consumption comes from alternative sources by 2020.²⁰

The Air Force first published an Installation Energy Management Strategy in 2008 and then followed up with a more comprehensive Air Force Energy Strategy 2010 in December 2009. This strategy combined operational and installation energy strategies into one. The Marines initiated the Expeditionary Energy Office (E2O) in October 2009 to analyze, develop, and direct Marine Corps’ energy strategy in order to

optimize expeditionary capabilities across all war fighting functions. The E2O is also synchronizing with the Marine Corps' Ten by '10 Campaign Plan. The intent of this campaign plan is to secure reliable energy and water supplies to support the operational force, meet the Congressional and Presidential targets for energy efficiency, and reduce life cycle operating costs.²¹ The key to each of these Service initiatives was the push by senior officials who finally raised the issue above the "funding cut line". The following comparison is based on the Army's AESIS, the 2010 Air Force Energy Strategy, Navy documents and presentations from the October 2009 Navy Energy Forum, and Marine documents. See appendix for a summary of Navy, Air Force, and Marine energy strategies.

Similarities and Differences in Service Energy Security Strategies

The four Service Energy Security Strategies align with the DoD Energy Security Strategic Plan's four higher level goals: 1) Maintain or enhance operational effectiveness by reducing total force energy demands, 2) Increase energy security through strategic resilience by assuring a energy supply, 3) Enhance operational and business effectiveness by institutionalizing energy solutions in DoD planning and business processes, 4) Establish and monitor Department-wide energy metrics.²²

Overall, all the strategies focus on reducing demand through efficiencies and operational improvements. The reduction of demand by leveraging technology to improve energy efficiency is a key consideration in acquiring new systems. All Services want to use the Fully Burdened Cost of Fuel (FBCF) as a key to evaluating systems and in developing requirements and war gaming. All Services focus on developing alternative and renewable energy sources as a key to assuring supply and reducing

dependence on fossil fuels. Finally, all recognize that the only way to change attitudes concerning energy efficiency is through training and developing a culture from the lowest levels to the top leadership. The Army and Air Force strategies target training and installation initiatives as a key for changing the culture in the operating forces.

The key difference among the various Service strategies is the implementation of the strategies. For example, the Army and Air Force have integrated the operational and institutional forces as one strategy while the Navy recognizes a distinct difference between the tactical and shore environments. The Marines also show the connection between the expeditionary and installation areas, but ultimately address them in separate campaign plans. This is a reflection of the different missions of the four Services and the importance of keeping the implementation plans at the local unit levels. For example, the Army and Air Force strategies contain similar objectives, but their different initiatives provide a reminder of their different missions.

However, some of the initiatives described by the Army and Air Force may benefit from sharing and potential economies of scale. The DUSD I&E can leverage these opportunities to set policy from which each of the Services can execute within their unique realms. Some initiatives could benefit from sharing between Services either through a joint effort or one acting as the Executive Agent.

Army Energy Security Implementation Strategy (AESIS)

The Army has a strategy and is moving out on its implementation. The Army Energy Security mission statement is to “make energy a consideration in all Army activities in an effort to reduce demand, increase efficiency, seek alternative sources, and create a culture of energy accountability, while sustaining or enhancing operational

capabilities.” The Army’s strategic energy security goals are: (1) reduce energy consumption, (2) increase energy efficiency across platforms and facilities, (3) increase use of renewable / alternative energy, (4) enhance energy security, and (5) reduce adverse impacts to the environment. The Army would reach each of these goals through twenty objectives supported by fifty-seven implementation activities. Each is managed by a designated Office of Primary Responsibility to develop metrics and refine the specific activity for implementation.²³

The AESIS was the result of the September 2008 Army Senior Energy Council (SEC) Charter directing the development of a strategy that would encompass consumption and utilization of energy for installations and facilities, weapons systems, and sustainable Contingency Operations Base Camps.²⁴ It is co-chaired by the Assistant Secretary of the Army (Installations and Environment) and the Vice Chief of Staff of the Army and includes three and four star general officers and equivalents representing the Army Staff and Major Subordinate Commands. Army leaders created the SEC to provide strategic guidance and oversight for implementing the Army’s energy strategy. Its structure was to ensure leadership involvement and raise the top issues above the ‘funding cut line’.

The AESIS focuses on objectives that will reduce demand, increase efficiency, seek alternative sources, and create a culture of energy accountability. The Army energy vision is built on a foundation of leadership, partnership, and ownership. Leadership from the highest to the lowest levels is crucial to any shift in culture which must occur at all levels. Leadership must initiate programs that reward innovation and hold individuals accountable. Partnership implies that the Army alone cannot implement

this strategy and that it will require working with other Services, DoD, other federal agencies, and the private sector. Ownership is the key to accountability and culture change. This starts with training at all levels to attain the Army's energy security goals.

The SEC relies on the SEC Advisory Board (2-Star level), chaired by the Deputy Assistant Secretary of the Army for Energy and Partnerships (DASA(E&P)), to review the assessments of energy implementation plans and provide feedback on meeting the goals set forth in the AESIS. SEC Working Groups consist of designated O-6 level representatives from the SEC member organizations and are formed along functional lines.

The Army is well on its way, but there are questions on the degree of leadership attention and support. The remaining portions of the paper will explore areas where improved leadership support will ensure energy security issues rise above the funding cut line.

Initiatives Requiring Leadership Support

Modeling Tool

To reduce energy demand, the Service strategies are best targeted at the planning, requirements development, and acquisition processes. This section will describe the current Army efforts to incorporate the Fully Burdened Cost of Fuel (FBCF) into the planning and requirements development processes. The next section will explore the status of implementing the energy efficiency Key Performance Parameter (KPP) in the acquisition process. Both of these initiatives are important to establishing a system within the Army and DoD to provide the necessary tools to ensure weapons systems and planning efforts place energy security issues above the funding cut.

The Defense Science Board report in 2008, the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (NDAA 2009), and other studies provided the same recommendations and provided direction (in the case of NDAA 2009) on how to incorporate fuel logistics support into planning, requirements development, and acquisition. One of the keys to planning and requirements development was agreeing on a definition of the Fully Burdened Cost of Fuel (FBCF) and developing a modeling tool for use in various applications. NDAA 2009 defined FBCF as the “commodity price for fuel plus the total cost of all personnel and assets required to move and, when necessary, protect the fuel from the point at which the fuel is received from the commercial supplier to the point of use.”²⁵ The Office of the Assistant Secretary of the Army for Cost and Economics initially took the task to develop FBCF factors for application during the Analysis of Alternatives (AoA) step in the Defense Acquisition process.²⁶ The Army would use the tool in determining FBCF for individual platforms / systems, cost-benefit analysis on various energy management options, support to the Analysis of Alternatives (AoA) step in the Defense Acquisition process for new systems, and for use Army wide as part of the training base.²⁷

The Army started development of this modeling tool in July 2005 when the Army Environmental Policy Institute (AEPI) initiated the Sustain the Mission Project (SMP-1), “to develop and apply an analytic methodology for calculating the fully burdened cost of fuel and water (FBCF and FBCW) to sustain Army missions in theaters of operations.”²⁸ AEPI is an agency assigned to the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health (DASA-ESOH) and operates as the primary advisor for policy analysis and development of emerging environmental issues

that may significantly impact the sustainment of Army installations and operations. SMP-1 developed an analytical methodology, pulling data from existing Army databases, to calculate the life cycle costs of fuel and water. This methodology included cost components beyond the energy commodity cost such as force protection, transportation, energy support military personnel in a Brigade Combat Team (BCT), energy support materiel in a BCT, Sustainment Brigade costs, and garrison facilities.²⁹ The success of SMP-1 led to SMP-2 which developed a user-friendly decision support tool for cost-benefit analysis of energy and water investments. SMP-2 applied this tool to a Stryker Brigade Combat Team operating in a mature theater like Iraq versus an immature theater. In this case the tool established an FBCF based on a standard fuel commodity cost of \$3.14 which escalated to an FBCF of \$14.13 in Iraq and \$17.44 in an immature theater.³⁰ From this baseline, planners analyze the cost-benefit of applying new technology and procedures to the fuel supply chain. The Army intended to distribute this tool in fiscal year 2008.

In fiscal year 2010, the Army Assistant Chief of Staff for Logistics (G-4) designated the Logistics Innovation Agency (LIA) as the lead for the next phase of Sustain the Mission Project (SMP) modeling tool development. The intent of SMP-3 is to distribute this tool for Army-wide use, standardization, and training. LIA will expand this tool to address additional Army units, beyond the SBCT, and for additional base scenarios such as Iraq, Afghanistan, Humanitarian Assistance (New Orleans), and training bases (Carson, Campbell, and Korea).³¹ This tool will allow planners to determine cost-benefit improvements for individual platforms / systems based on various energy management options. It is also an acquisition tool to support the

Analysis of Alternatives (AoA) step in the Defense Acquisition process for new systems. Another benefit of this tool is the application to the Army wide training base.

Part of the challenge with the SMP initiative is the length of time necessary to get this tool to the field. It will have taken more than 5 years from July 2005 at the inception of SMP until the current projected completion of September 2010 for SMP-3. The level of leadership attention and resourcing is the only mechanism to move this effort quickly and must continue in order for the tool to benefit the Soldier. The SMP-3 tool's value is not realized until it provides more accurate scenario planning, requirements development, and reduces the risk to Soldiers. Until then, it is just another good idea.

Acquisition

The FBCF also applies to the acquisition process but more important are the Key Performance Parameters (KPPs). Each of the weapons systems or support platforms used today on the battlefield requires some form of energy to operate. Managing the demand of energy for these systems starts in the acquisition process where criteria for system evaluation determine the impact of energy consumption. KPPs are attributes or characteristics that are critical or essential to the development of an effective military capability such as a weapons system or vehicle. There are only two mandatory KPPs, Force Protection and Survivability, for systems designed to house personnel or required to enhance survivability.³² A 17 August 2006 Joint Staff memorandum stated that the Joint Requirements Oversight Council (JROC) endorsed, "selectively applying an Energy Efficiency KPP as appropriate."³³ The energy efficiency KPP is not mandatory, but one of two selectively applied KPPs. The challenge is creating a process to determine, in an objective fashion, when the energy efficiency KPP should be

“selectively” applied. Both the Defense Science Board Report of 2008 and NDAA 09 specifically address the incorporation of an energy efficiency KPP into the acquisition process. Three years after this 2006 JROC memo, the Joint Chiefs of Staff J4 (Logistics) and the Office of the Under Secretary of Defense for Acquisition, Logistics & Technology (OUSD AT&L), awarded a contract to develop the energy efficiency KPP. The contractor was tasked to develop criteria in selecting programs where this KPP is best applied and a framework for grading selected programs.³⁴ This is a great first step, but the results of the study will determine the application of this selective KPP. When capabilities documents require energy efficiency as part of the process, then DoD must apply the energy efficiency KPP appropriately to ensure fuel demand does not place service members at risk. This is the primary mechanism to develop new weapons systems that will reduce the demand of energy. However, any loss of leadership attention or accountability could easily place this KPP into a holding pattern. The evidence is provided by the slow implementation: this was a JROC requirement back in 2006.

A great example of how the energy efficiency KPP can impact a weapon system’s capabilities is the Ground Combat Vehicle (GCV). Major General (retired) Robert Scales recently described the capability of a GCV based on the current and future environment our Soldiers will face. He laid out characteristics of the GCV given the new way in which Soldiers must operate. In the area of defeating Improvised Explosive Devices (IEDs) Major General (MG) Scales stated that an increase in armor simply adds weight to a vehicle reducing its fighting effectiveness. An energy efficiency KPP could bring this issue to the forefront in analyzing various options as a heavier

vehicle requires a larger power plant to meet other fighting effectiveness criteria. MG Scales' recommendation was to create a balance between protection and mobility coupled with the knowledge that IEDs are best defeated through avoidance versus protection from the blast. An energy efficiency KPP would help temper the desire to add capabilities that add weight and increase fuel consumption. He also suggested that future small units will operate away from forward operating bases for longer periods of time.³⁵ In this scenario, the energy efficiency KPP could push for endurance and fuel consumption as a key contributor to an extended range. The key to this example is that a selective KPP would benefit the weapons system if it is also coupled with other attributes that are critical to the development of that military capability. Recently the Secretary of the Army and Chief of Staff of the Army, in joint testimony, stated that the GCV can combine the lessons learned from today's war where the top criterion is protecting Soldiers who can remain highly mobile. For the first time, Army leaders spoke of a weapons system that must "combine sustainability features that match the availability rates of the Stryker while consuming less fuel than current vehicles of similar weight and power."³⁶ The value of the energy efficiency KPP is that a leader understands its direct connection to enhancing a war fighter's capability. An energy efficiency KPP alone will not reduce our demand for fuel, but the link to the mission will lead to a more balanced solution and raise the issue above the funding cut line.

Measuring Energy Consumption

The Fully Burdened Cost of Fuel (FBCF) modeling tool will provide units and program managers a tool to establish costs for a baseline from which new technology or processes can be compared. However, there is no current measure for Army

installations to establish a baseline at the building level on energy consumption much less the impact of new technologies or processes. The Energy Policy Act of 2005, directed that by October 1, 2012, all Federal buildings shall be metered based on established guidelines.³⁷ The guidelines set by DoD require advanced metering on buildings that consume an estimated \$35,000 per year in electrical costs which equates to buildings larger than 29,000 square feet.³⁸

Mr. L. Jerry Hansen, the Acting Assistant Secretary of the Army (Installations & Environment) stated in recent testimony that the Army had installed advanced electrical meters in 40 percent and natural gas meters in 20 percent of its buildings through fiscal year 2009 or a three-year period since the Energy Policy Act of 2005.³⁹ In order to meet the law, the Army must meter 60 percent of its buildings over the next two fiscal years. Challenges in funding have delayed this effort. The Energy Independence and Security Act of 2007 goes one step further and requires natural gas and steam meters on all Federal buildings by October 1, 2016.⁴⁰ This delay in metering limits the Army's ability to evaluate new energy systems and their relative impact. Leadership attention must ensure appropriate funding, not only to meter buildings by October 2012, but also to provide a comparable baseline to new energy efficiency efforts.

Establishing a baseline for buildings is important, but it is also important for energy consumption data to get into decision models that affect change within a system. Advance metering must provide the necessary building level information to an enterprise wide information system that ensures good management decisions and holds units and installations accountable. The Army Energy Security Implementation Strategy contains an objective to create an enterprise-wide energy management tool for utility

and energy systems. This is not a simple task, requiring the metering of buildings and improving the existing Army Energy and Water Reporting System (AEWRS). The current AEWRS requires data input from the installation but does not get to the building level.⁴¹ In cases where buildings are metered, this information exists but is consolidated at the installation level and fed into AEWRS. There is little unit accountability without building level information.

Measures are only effective if the information is accurate, timely, and available to leaders responsible and accountable for the outcome. The Defense Readiness Reporting System (DRRS) is a network of applications that provide the capabilities of U.S. forces and their associated risks. DRRS-A is the Army component to this system and is a “computerized, secure, web-enabled set of capabilities that reports mission-critical information, including personnel levels, training status, equipment availability and equipment serviceability.”⁴² This system subsumed the traditional Unit Status Report (USR). It also provides an opportunity to incorporate some of the energy security metrics as part of an installation’s ability to sustain its operations. A recent study commissioned by the Strategic Environmental Research and Development Program (SERDP) proposed a template for military installations to measure the sustainability of critical natural resource, environmental, and social factors.⁴³ This report defined sustainability as the “capacity for continuous operations in the long term coupled with resilience for maintaining operations in the case of short-term shocks and disturbances.”⁴⁴ Examples of metrics ← performance measures that could provide accountability for energy security include power generation and consumption, water supply and consumption, waste generation and disposal, and other areas critical to the

sustainability of an installation. This type of system would link a unit's energy consumption with readiness and begin reducing the dependence of military installation's local utilities and operations. Each commander would use the system to weigh the risks of those dependencies against the mission of the installation. Then energy initiatives will receive the leadership attention required to get "above the funding cut line." Continued leadership support for such an initiative is important as it links energy security to the readiness level of units and installations.

Innovation

The Service energy strategies all point towards increasing the use of renewable and alternative energy sources. The push towards innovation may result in DoD investments in technologies that may or may not prove sustainable in the long run. The innovation challenge is to maintain the value of creativity while managing the risk of costly and long-term initiatives. The recent 2010 Quadrennial Defense Review summarizes this challenge as our ability to acquire capabilities quickly and efficiently but at the outer edges of technology.⁴⁵ "First, the requirements for new systems are too often set at the far limit of current technological boundaries. Such ambition can sometimes help produce breakthrough developments that can significantly extend America's technological edge. Far too often the result is a disappointing initial performance followed by chronic cost and schedule overruns."⁴⁶ This is the challenge for creating alternative and renewable energy sources that must balance the technological limit with cost and timeliness.

Every contractor or academic institution has the "answer" to increasing the energy supply through biofuels, solar, wind, wave, algae, nuclear or other new

technologies. Since none of these sources currently enjoy resounding support as the magical answer, it is clear that the future for alternative and renewable fuels is the portfolio approach. As the Army and DoD move forward, new technology investment and risk requires balance and diversity similar to a financial investment portfolio. Natural gas is relatively clean and provides efficient combustion, but similar to oil, three-quarters of the world's reserves are located in the Middle East and Eurasia.⁴⁷ Nuclear power provides efficient and clean energy but remains burdened with the historic safety tag thanks to Three Mile Island and Chernobyl. Still, there are no clean answers to the high costs of building power plants and the disposition of the waste material. Biofuels have made large advances in fueling trucks and cars, but concerns continue with the impact on food sources, water supply, and land utilization.⁴⁸ Without a doubt, oil will remain part of the energy portfolio for the future. The U.S. Department of Energy projects that oil as a percentage of the total energy sources will only drop from 38 percent in 2004 to 34 percent in 2030.⁴⁹ It is unreasonable to think that we can swap oil for another energy source. Innovation must keep a balance between creativity and financial risk within the energy portfolio.

Innovation is not just new technology. It also includes different methods to acquire new forms of energy, and in many cases, sharing the risk with the private sector. We are no longer able to define a scope of work and select the best value contractor to produce a widget. Maybe through private sector cooperation and alternative capital funding there is a win-win scenario. The government provides a stable platform to apply new methodologies and will never default. A private company has the ability to take greater risks for higher payouts and can make quicker decisions

on acquiring new ideas. There is a common ground that forms an innovative way to apply alternative and renewable energy sources.

Congressional language could assist in developing more non-traditional initiatives such as OnPoint Technologies. The Department of Defense Appropriations Act for Fiscal Year 2002 directed the Army to use \$25 million of Research, Development, Test and Evaluation (RDT&E) funds to create a non-profit Army venture capital corporation.⁵⁰ A Rand Arroyo Center Issue Paper in 2000 suggested that the “U.S. Army is having difficulty balancing its need for new technologies with the resources available to develop them.”⁵¹ The paper suggests that venture capital brings the efficiency in developing technology, access to commercial technology, flexibility to adapt, and the ability to leverage resources. It concluded that the Army should set up a not-for-profit venture capital corporation.⁵² The result was OnPoint Technologies which as a private equity investor can attract small growth-oriented companies who are developing innovative technologies that align with the U.S. Army.⁵³ According to their website, the size of investments range from \$500K to \$2M, and focus on Mobile Power and Energy Enabling Technologies.⁵⁴ Leadership focus and support for a balanced alternative fuel and renewable energy portfolio will spread the risk and enhance innovation. New ideas such as the venture capital corporation, OnPoint Technologies, could provide the answer towards pushing the limits of innovation without the burden of investments that go nowhere.

Culture Change

Throughout U.S. history, the Armed Forces were frequently used to shift public opinion on sensitive issues by leveraging the Soldier who represented many aspects of

American society. The Civil Rights movement is among the most recognizable issues where a common enemy on the battlefield incrementally led to racial equality within the military. It was President Truman's signing of Executive Order 9981 on 26 July 1948 that called for the Armed Forces to provide equal treatment and opportunity for black servicemen.⁵⁵ This was just the start of true integration in the military, but it provided a push for integration within American society. As with the Civil Rights movement, a cultural shift relies on consistent training and reinforcement within units. It is at this level where standard values form the culture of future military generations.

Each of the Service energy security strategies call for a culture shift as the enduring initiative that ultimately makes the most significant changes in reducing demand and increasing supply of energy within the Armed Forces. However, is a culture change objective reasonable? In this section we will explore culture shifts and examine how the Army can best implement this shift by including cultural change as an aspect in every objective and initiative of the AESIS.

Edward Schein, a noted researcher organizational behavior, defined organizational culture as a group's shared assumptions developed as it solved problems adapting to its external environment while integrating within its organization. The key was what the group deemed as valid was then taught to new members as the correct way. An organization would share these assumptions through "Culture Embedding Mechanisms." One of the Culture Embedding Mechanisms focused on where the leaders would pay attention and measure. Consistency is more important than intensity as it communicates the major beliefs while the measures create accountability. The second Culture Embedding Mechanism is a leader's reaction to

critical incidents or organizational crises. Crises heighten anxiety, which, in turn, motivates new learning. Another critical mechanism is the process for resource allocation. Initiatives above the funding cut line communicate the priorities of the organization. Deliberate role modeling, teaching, and coaching is the last mechanism and focuses on how the leadership at all levels buy-in to this culture. If leaders think it's important and include it in their daily operations, then subordinates will do the same. Teaching and coaching provide recognition or feedback to reinforce the values and culture of an organization. It is either formal rewards or simply feedback and counseling between supervisors and their employees.⁵⁶

The “attention” Embedding Mechanism is now emerging within DoD as evidenced by the various Service strategies. However, only the Navy and Marine Corps leadership have actively engaged the topic in public through recent symposiums and Congressional testimony. The Marine leadership is the most vocal as the Commandant of the Marine Corps has taken it upon himself to be the champion. It is unclear if that same level of attention will occur within the Army and Air Force although recent House Armed Services Committee written testimony in February 2010 included sections referring to their respective energy strategies.

The reaction of leaders to the current challenges in Iraq and Afghanistan could help to shift the Army culture in many different areas including energy security. To date, the involvement of the operational force in implementing the AESIS is limited but slowly growing. The Embedding Mechanism of leaders reacting to crises is another opportunity to shift the Army culture, but much is left to be done in this area. This perspective is echoed by Joe Tye who consults for health care organizations seeking to

continue shifting their culture to keep up with the dynamic world of health care. He states that “the best time to gain buy-in for cultural transformation is in the midst of a crisis. We might not be able to change the external environment immediately, but we can start right now by promoting a culture of ownership within our organizations.”⁵⁷ Only leaders can energize a culture of ownership. Each of the Service strategies state that every service member and civilian are part of the solution.

Another Embedding Mechanism is deliberate role modeling, teaching, and coaching of energy security which is almost non-existent within the Army, particularly in the operational force.⁵⁸ Until the necessary training programs are integrated at all levels, coaching and teaching will remain a topic left to segments of the Army that truly benefit from the immediate payback of energy reduction.

Both the Air Force and Army have developed specific objectives and initiatives that target the development of energy management curriculums as part of existing training programs for military and civilians. The Air Force strategy relies on Culture Change as one of three primary pillars in their energy strategy. Their approach is consistent as it pushes the need for airmen, civilians, and contractors to make energy security a personal priority. Their Culture Change work group focuses primarily on the leadership and training aspects that are measurable. However, the remaining work group objectives do not appear to include the cultural aspects within their initiatives.

The last and most important Embedding Mechanism is the allocation of resources which is best exemplified in the Army’s Program Objective Memorandum (POM) build process.⁵⁹ A particular Army organization’s required resources for an intended output form a Management Decision Package (MDEP). Multiple MDEPs form

Program Element Groups (PEGs) which represent various categories and form the basis for the Army POM. The majority of the resources required to support the AESIS currently fall into the Installation (II) PEG. This is a challenge as it implies that the only requirements addressed by the Army in the Fiscal Year 2012-2017 Program Objective Memorandum (FY 12-17 POM) are the requirements associated with installations. Energy operational requirements reducing the risk to Soldiers are not directly reflected in this POM build. The results of the FY 12-17 POM will indicate the shift in the Army's energy security culture.

The US Army War College's *Strategic Leadership Primer* defines organizational culture as "the set of institutional, stated, and operating values, beliefs, and assumptions that people have about their organization that are validated by experiences over time."⁶⁰ Given this definition, the Army challenge is to validate Soldier experiences where energy security has posed risk to Soldiers thereby reducing the fighting strength. The SMP initiative using FBCF and the AEPI study associating casualties with fuel resupplying address the risk of uncontrolled fuel demand.

Besides the Embedding Mechanisms suggested by Edward Schein, any transformation of an organization's culture relies on the people who comprise that culture. Former Chairman of the Joint Chiefs of Staff, General Richard Myers, stated that, "radars, stealth technology, unmanned aircraft, new communications capabilities are all important to transformation but, the people using the equipment are the most transformational aspect of any system."⁶¹ All four Service strategies focus on people, but until the leadership lives energy security as a priority, it will not reach the 'funding line' or 'priority' of individuals.

The Air Force Energy Strategy is poised to implement Edward Schein's Embedded Mechanisms paradigm, although it is unclear whether the funding elements are in place in the FY 12-17 POM. The Strategy's Culture Change work group focuses on Schein's attention mechanism, "Instilling energy awareness across the Air Force is a cornerstone goal of the Culture Change Working Group. As an energy management culture develops within the Air Force community, a firm foundation of attitudinal and behavioral norms emerges, providing all airmen with the impetus to factor energy in their daily operations. As personal responsibility in energy management permeates throughout the Air Force, shared values will unlock mass innovation in finding ways to utilize energy in more efficient ways."⁶²

Similar to the AESIS, the Air Force will focus on education, training, and personal communication to link the importance of energy to the overall mission. If leaders can get this message to those who build the requirements, the Culture Change work group will meld into other areas of the energy strategy and will no longer be required as its own stove piped initiative. The incorporation of energy-knowledge measurements will allow the Air Force to evaluate how familiar airmen are with the Air Force's commitment to energy management. The key to sustaining a shared vision of making energy a consideration of the Air Force is to continuously educate, train, and communicate across the organizational structure.⁶³

The AESIS initiatives on training have not been developed in detail, but leadership attention in training must accompany other aspects of the Army's energy security push. DoD and the Services are headed in the right direction, but obtaining the desired cultural change will require greater leader involvement, training, and

prioritization of funding to assure sustained change. The key is to eliminate Culture Change as a work group or objective in the energy strategy due to the inclusion of the necessary aspects mentioned in this section in all areas of the Army and DoD.

Recommendations

The Army is well on its way towards integrating energy security in its current operations. There has been more progress within the last two years than in the previous eight years following the first Defense Science Board Report in 2001. Below are recommendations that enhance ongoing initiatives within the Army Energy Security Implementation Plan (AESIS) and DoD energy strategy.

1. Continued leadership attention is required to ensure the culture change that will manifest in training program support, sustained funding, and focus on people. The Army is well suited for this change but it requires involvement by leaders at all levels.
2. The Army must not only treat energy security as a separate initiative, but also integrate energy concerns and requirements into every military initiative. Leaders must understand and embrace the value of energy security to their missions.
3. The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) and the new Director of Operational Energy Plans and Programs should develop overarching policy, measures of accountability, and sustainable funding levels for energy security initiatives supporting both the Operational and Institutional Forces.

4. Army leadership must increase its support to quickly move the FBCF modeling tool into scenario planning and requirements development. It has taken the Army more than five years from the inception of Sustain the Mission Project (SMP) in 2005 until the projected completion of SMP-3 in September 2010.
5. Only DoD leadership attention and accountability will appropriately place the energy efficiency KPP into the acquisition process. The KPP is not mandatory; therefore the DoD must ensure its value is not lost when developing the criteria for its selective application.
6. The Army must fund and execute metering of all buildings. This is not only to meet the Energy Policy Act of 2005, but, more importantly, to establish a baseline for comparison of new innovations.
7. The Army can and should integrate energy consumption information into the existing DRRS-A system to provide installation and unit level accountability. The recently published SERDP study provides a framework for inclusion of this information into DRRS-A.
8. The Army must approach new technologies through a balanced portfolio approach in order to spread the risk and allow for application of more innovations.
9. Alternative capital funding may help the military push the limits of innovations without the burden of risky investments. OnPoint Technologies or similar programs provide different mechanisms to spread the risk.

Conclusion

Department of Defense and Army dependence on energy inhibits performance of weapons systems and places Soldiers at risk. Leaders must raise this issue above the funding cut line to reduce that risk. They must understand the value of energy security in each aspect of the mission. The exemplar for leadership involvement is the Commandant of the Marine Corps, General Conway, who is taking personal responsibility for making energy security a Marine priority. The Army continues to push the Army Energy Security Implementation Strategy (AESIS), but it is unclear if the initiatives and objectives receive the necessary leadership attention and resourcing. The upcoming budget and program submissions will dictate the level of Army leader support for these initiatives. A successful AESIS will properly articulate the value of energy security initiatives. Leaders at all levels must understand this value and energy security's importance to their mission accomplishment. If adopted, the recommendations in this paper will enhance existing efforts in providing the tools for a sustained effort that raises energy security above the funding cut line at all levels.

APPENDIX

Summary of Air Force, Navy, and Marine Corps Energy Security Strategies

Air Force

Three pillars guide energy management in the Air Force strategy: Reduce demand, increase supply, and culture change.⁶⁴ Due to its mission the Air Force is the largest user of energy within the federal government and has the ability to affect more change by managing demand while at the same time endures the most risk due to its reliance on energy.

The Energy Senior Focus Group (SFG) is chaired by the Air Force Senior Energy Office, the Under Secretary of the Air Force, and the Vice Chief of Staff of the Air Force and is responsible to ensure that all goals and objectives of the energy strategy are properly integrated among the work groups. There are five primary work groups: Aviation Operations, Acquisition & Technology, Provide Infrastructure, International, and Culture Change. The work groups establish guidance and reporting metrics to ensure application to all relevant sectors of the Air Force. Three advisory work groups; strategic communication integration, critical infrastructure program, and innovative financing, support initiatives that cross all mission areas. Each of the primary and advisory work groups developed goals, objectives, and metrics to implement the Air Force energy strategy.⁶⁵

The Provide Infrastructure, Aviation Operations, and Acquisition & Technology work groups developed energy strategies as appendices to the overall Air Force Energy Strategy. The remaining work groups and advisory groups generated forty-three objectives to support the overarching pillars, reduce demand, increase supply, and

change the culture. The advisory group objectives cut across the primary work groups. For example the Critical Infrastructure Program advisory work group focuses on developing risk mitigation strategies to protect critical infrastructure.⁶⁶ As stated in this research paper one of the greater risks of military installations is the reliance on local electrical grids for powering installation which support critical military operations. The current nation-wide electric grids are vulnerable to disruptions due to age, demand, and complexity of the systems not to mention potential terrorist attacks.

The Aviation Operation work group is focused on standardizing procedures and establishing objectives to improve efficiency in flying operations. The various pillars within this work group look to leadership, operational efficiency, and instilling awareness around aviation operations. Targets include fuel load configurations where loading of aircraft and fuel loads may create inefficiencies. Using the Fully Burdened Cost of Fuel (FBCF) could result in different operational decisions when comparing air refueling versus ground refueling.⁶⁷ The most surprising component of this work group is the emphasis on changing behavior as opposed to technology and innovation. The preceding examples of fuel loads and air refueling are current practices that don't take into account the cost of fuel and may easily reduce consumption rates when comparing to mission requirements.

The Acquisition and Technology work group is chaired by the Assistant Secretary of the Air Force for Acquisition (SAF/AQ) and divided into two areas. One focuses on existing technologies that will improve efficiencies within current fleet and the other on developing new, weapon systems or technologies to be retrofitted into the current fleet.⁶⁸

The Provide Infrastructure work group is chaired by the Air Force Civil Engineer (HAF/A7C) with expectation of institutionalizing initiatives through the Wings, Major Commands (MAJCOMs), and Headquarters, Air Force. One of the objectives for governance is to formally charter an Energy Management Steering Group at all levels to promote, review performance and allocate resources for energy management initiatives.⁶⁹ This last governance objective would ensure accountability at all levels.

Navy

As of February 2010, the Navy had not formally published an Energy Security Strategic Plan. However at the October 2009 Naval Energy Security Forum, Navy leadership frequently referred to the strategy. Based on existing publications it is clear that the Navy has set off on a similar strategy to the other two services albeit specifically tailored for the Navy. In fact, during the October forum, Secretary of the Navy, the Honorable Ray Maybus, announced new goals specific to the Navy that far exceeded targets set by current statutes and DoD policies. The strategy cuts across the tactical and shore pillars within the Navy focusing on ensuring an adequate, reliable, and sustainable energy supply; investing in development and application of technology to reduce demand and increase alternative / renewable energy supply; and using policy and doctrine to change behavior to account for energy cost and security.⁷⁰

Recently the Secretary of the Navy established a Deputy Assistant Secretary of the Navy for Energy (DASN-Energy) to consolidate both operational and installation energy missions. This position would report to the Assistant Secretary of the Navy (Installations & Environment) (ASN I&E) and will develop overarching policy and oversee the continued development of new ideas to include aligning existing programs.

Within the Chief of Naval Operations (CNO) office, the Navy Energy Coordination Office (NECO) develops and institutionalizes the Navy's Energy Strategy.⁷¹ The Navy's Energy Security Task Force consists of a Senior Advisory Group (SAG) and a Cross Functional Team (CFT) with seven energy security working groups including Aviation, Maritime, Expeditionary, Fuels, Strategic Impacts, Environmental, and Ashore.⁷²

Marine Corps

In January 2010, the Marine Corps held a Power and Energy Symposium, titled "Lightening the load: Reducing the footprint in the expeditionary environment". The Commandant of the Marine Corps, General James T. Conway, summarized the strategic direction by declaring, "Our goal is to be completely self-contained." This position stems from the risk to our forces to maintain a secure supply line created to meet the high fuel demand of our weapons systems. An uncontrolled demand effectively creates a supply line requiring forces for security that in turn takes away from the fighting strength. General Conway stated, "we take 10 to 15 percent of casualties among Marines involved in the delivery of fuel and water," he said. "We can do better."⁷³

The Marine Corps Logistics Roadmap 2009 included the Marine Corps Energy Program which describes a comprehensive strategy requiring a shift from viewing energy as a commodity paid out of an annual budget to an operational vulnerability. This is a fundamental shift away from the thinking that "if we run out, we'll get more". If the new thinking focuses on operational vulnerability then it is part of the normal planning process reducing reliance on the supply line. The strategy focuses on two areas: increased installations energy conservation and security, and increased operational energy independence. The strategy directs implementation of mandatory

consideration of energy efficiency as a key performance parameter (KPP) in all replacement platforms, partnering between acquisition and Research and Development activities to develop alternative and renewable energy sources, and immediate implementation of energy-saving methods and materials in forward-deployed contingency installations.⁷⁴

In 2009 the Commandant of the Marine Corps (CMC) published the Marine Corps Facilities Energy & Water Management Program Campaign Plan titled, “Ten by ’10: Top 10 Things To Do by 2010 to Reduce USMC Energy Risks”. The CMC cites the rising cost of energy and the risk of interruption in providing electricity, fuel, and water to their bases and stations as a combat readiness issue. The Campaign Plan conveys the CMC’s intent and guidance for implementation to include identifying key leadership roles by position. The intent is to secure a reliable energy and water supply to support the forces and their families, achieve energy and water efficiency goals, and reduce life cycle operating costs of facilities. The top ten includes topics such as a command culture for energy and water efficiency, appropriate resources to execute programs, evaluating cost effectiveness of new technologies, meeting federal standards, phase out all incandescent bulbs, and establishing training and awareness programs.⁷⁵

While the Top Ten by ’10 focused primarily on installations, in October 2009, the Commandant of the Marine Corps (CMC) directed the creation of the Expeditionary Energy Office (E2O) to analyze, develop, and direct the Marine Corps’ energy strategy in order to optimize expeditionary capabilities across all war fighting functions.⁷⁶

The primary focus of E2O is on the operational environment seeking both near and long term solutions that will reduce the risk posed to Marines due to the demand for

energy. The quote sums up the E2O is, “don’t admire the problem, make things happen today”. The E2O would carry out its mission by coordinating all Expeditionary Energy Marine Corps efforts including coordination with other governmental agencies. The E2O is to leverage installation energy saving technology for application in an expeditionary environment. Ultimately the E2O would develop the Expeditionary Energy plan, metrics to measure successes, and create an implementation team. Recent assessments by the Marine Energy Assessment Team (MEAT) in Afghanistan showed that there are several low cost initiatives that can make a large difference in reducing demand without affecting the operational mission. One of the quick wins was the team’s recommendation to better manage the utilization of generators at Forward Operating Bases (FOB). At one FOB all generators were operating at or less than 30 percent load. Through training at the unit level and providing power management systems, the FOB could remove two-thirds of the generators resulting in a 36 percent reduction in fuel demand for electricity production.⁷⁷

ENDNOTES

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